

## **A Study of Rapidly Developing Low Cloud Ceilings in a Stable Atmosphere at the Florida Spaceport**

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Forecasters at the Space Meteorology Group (SMG) issue 30 to 90 minute forecasts for low cloud ceilings at the Shuttle Landing Facility (KTTS) in Kennedy Space Center, FL for all Space Shuttle missions. Mission verification statistics have shown cloud ceilings to be the biggest forecast challenge. SMG forecasters are especially concerned with rapidly developing cloud ceilings below 8000 ft in a stable, capped thermodynamic environment because ceilings below 8000 ft restrict Shuttle landing operations and are the most challenging to predict accurately. This project involves the development of a database of these cases over east-central Florida in order to identify the onset, location, and if possible, dissipation times of rapidly-developing low cloud ceilings. Another goal is to document the atmospheric regimes favoring this type of cloud development to improve forecast skill of such events during Space Shuttle launch and landing operations.

A 10-year database of stable, rapid low cloud development days during the daylight hours was compiled for the Florida cool-season months by examining the Cape Canaveral Air Force Station sounding data, and identifying days that had high boundary layer relative humidity associated with a thermally-capped environment below 8000 ft. Archived hourly surface observations from KTTS and Melbourne, Orlando, Sanford, and Ocala, FL were then examined for the onset of cloud ceilings below 8000 ft between 1100 and 2000 UTC. Once the database was supplemented with the hourly surface cloud observations, visible satellite imagery was examined in 30-minute intervals to confirm event occurrences. This paper will present results from some of the rapidly developing cloud ceiling cases and the prevailing meteorological conditions associated with these events, focusing on potential pre-cursor information that may help improve their prediction.

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